MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT: YEAR 2010

Wagner Marsh
Billings, Yellowstone County, Montana

Prepared for:

MONTANA DEPARTMENT OF TRANSPORTATION
2701 Prospect Ave
Helena, MT 59620-1001

December 2010

Prepared by:

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MORRISON MAIERLE, INC.
An Employee-Owned Company

MONTANA DEPARTMENT OF TRANSPORTATION

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MDT Project Number STPX 56(50)
Control Number 4645

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CCI Project No: MDT.004

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CONFLUENCE

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1. INTRODUCTION

The Wagner Marsh Mitigation Site 2010 Monitoring Report presents the results of the sixth year of monitoring at the Wagner Marsh wetland mitigation project. The mitigation site was constructed in the east portion of the Upper Yellowstone River Watershed 13 during spring 2005 to mitigate for wetland impacts resulting from Montana Department of Transportation (MDT) highway and bridge construction projects in the watershed. Wagner Marsh, also referred to as the Wagner Pit, was constructed on MDT property originally purchased in 1954 and used as a borrow area (gravel mining) for construction of the Interstate 90 (I-90) corridor. The goal of the project was to develop wetland hydrology at the site, ultimately providing 21.59 acres of palustrine emergent and scrub-shrub wetland within the confines of the 39-acre site. Approximately 2.12 acres of palustrine emergent and scrub-shrub wetland, and 1.75 acres of open water were created incidentally by MDT in 2003 (PBS&J 2009).

The site occurs at an elevation of approximately 3,240 feet above mean sea level. It is located on the west edge of Billings, Montana, north and east of the intersection of Danford Road and 56th Street in the southwest quarter of Section 28, Township 1 South, Range 25 East, Yellowstone County (Figure 1). The approximate universal transverse mercator (UTM) coordinates for the central portion of the site are in Zone 12N at 5,065,220 Northing and 682,385 Easting (PBS&J 2009). Figures 2 and 3 (Appendix A) of the monitoring report show the mapped site features and monitoring activity locations, respectively. Appendix B contains the MDT Mitigation Site Monitoring Forms, the US Army Corps of Engineers (USACE) Routine Wetland Determination Data Forms (Environmental Laboratory 1987), and the MDT Montana Wetland Assessment Forms. Appendix C contains relevant site photographs and Appendix D includes the project plan sheet.

The project encompasses two previously created wetland and open water areas totaling 3.87 acres and seven constructed wetland cells projected to total 17.72 acres. The wetland hydrology was supplied historically by a high groundwater table with minimal contribution from precipitation. Groundwater is currently being pumped from the Knife River gravel pit to the west of 56th Street into Wagner Marsh as their dewatering activities affected MDT groundwater within the site. The MDT previously secured groundwater rights to ensure that there was a sufficient water source for the wetland cells long-term. No surface water outlet exists at the site. An upland buffer was included in the mitigation credits for the project. No performance standards were available for the site.

Wetland credits for the site were determined using the following ratios (PBS&J 2009).

- Credit of 1:1 for wetland establishment/re-establishment for in-kind mitigation conducted prior to wetland impacts.

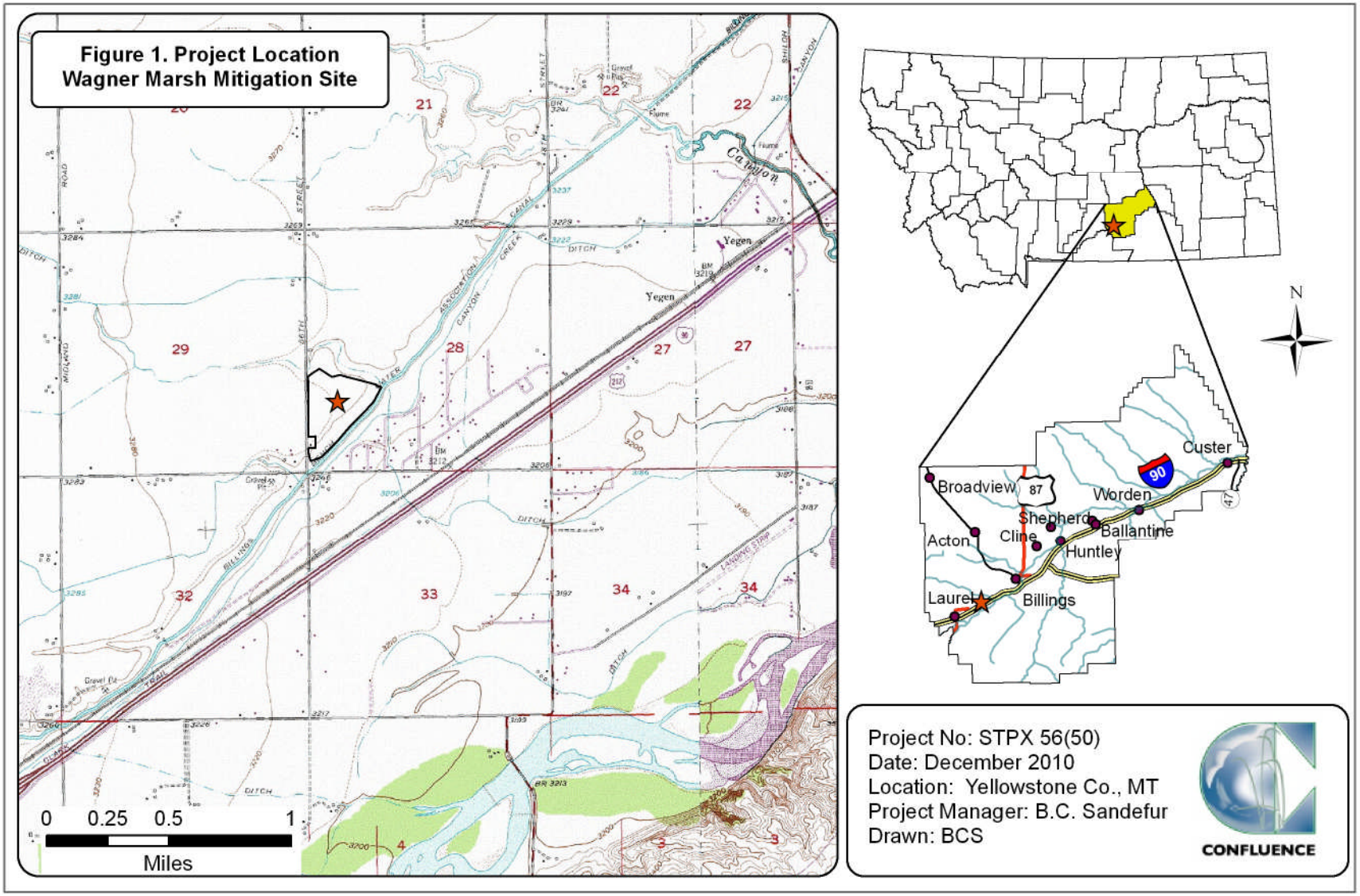

Figure 1. Project location Wagner Marsh Mitigation Site.

- Credit of 1.5:1 for out-of-kind wetland mitigation, or if wetland impacts occurred prior to the reserve's establishment.
- Credit for open water is limited to no more than 20 percent of the amount of actual wetland acreage that develops onsite.
- Upland buffers are limited to a maximum width of 50 feet and are credited at a ratio of 4:1.

2. METHODS

The site was monitored on August 11, 2010. Information contained on the Monitoring Form and Wetland Data Forms was entered electronically in the field on a personal digital assistant (PDA) palmtop computer during the field investigation (Appendix B). Monitoring activity locations were mapped using a global positioning system (GPS) (Figure 2, Appendix A). Information collected included wetland delineation, vegetation community mapping, vegetation transect monitoring, soils data, hydrology data, bird and wildlife use documentation, photographs, and a non-engineering examination of the infrastructure established within the mitigation project area.

2.1. Hydrology

Technical criteria for wetland hydrology guidelines have been established as "permanent or periodic inundation, or soil saturation within 12 inches of the ground surface for a significant period (usually 14 days or more or 12.5 percent) during the growing season" (Environmental Laboratory 1987). Systems with continuous inundation or saturation for greater than 12.5 percent of the growing season are considered wetlands. The growing season is defined for purposes of this report as the number of days where there is a 50 percent probability that the minimum daily temperature is greater than or equal to 28 degrees Fahrenheit (Environmental Laboratory 1987).

Hydrological indicators as outlined on the Wetland Data Form were documented at three data points established within the project area. Hydrologic indicators were evaluated according to features observed during the site visit. The data were recorded on electronic field data sheets (Appendix B). Hydrologic assessments allow evaluation of mitigation goals addressing inundation/saturation requirements.

Three soil pits excavated during wetland delineations were used to evaluate groundwater levels within 18 inches of the ground surface. The data were recorded electronically on the Wetland Data Form (Appendix B). Water levels were also measured in two wells, MW-1 and MW-3, during the 2010 investigation. The cap on MW-2 was locked.

2.2. Vegetation

The boundaries of dominant species-based vegetation communities were determined in the field during the active growing season and subsequently delineated on aerial photographs. The percent cover of dominant species within a community type was estimated and recorded using the following values: 0 (less

than 1 percent) 1 (1 to 5 percent) 2 (6 to 10 percent), 3 (11 to 20 percent), 4 (21 to 50 percent), and 5 (greater than 50 percent) (Appendix B).

Temporal changes in vegetation were evaluated through annual assessments of a static belt transect (Figure 2, Appendix A). Vegetation composition was assessed and recorded along a single belt transect approximately 10 feet wide and 578 feet long (Figure 2, Appendix A). The transect location was recorded with a GPS unit. The percent cover of each vegetation species within the transect was estimated using the same ranges and values listed above (Appendix B). Photographs were taken at the endpoints of the transect during the monitoring event (Appendix C).

The location of noxious weeds was noted in the field and mapped on the aerial photo (Figure 3, Appendix A). The noxious weed species identified are color-coded. The locations are denoted with the symbol "+", "▲", or "■" representing 0 to 0.1 acre, 0.1 to 1.0 acre, or greater than 1.0 acre in extent, respectively. Cover classes listed on Figure 3 (Appendix A) are represented by T, L, M, or H, corresponding to less than 1 percent, 1 to 5 percent, 2 to 25 percent, and 25 to 100 percent, respectively.

A total of 550 woody plants comprised of seven species were planted at the mitigation site after construction. Survival was assessed annually.

2.3. Soil

Soil information was obtained from the *Soil Survey for Yellowstone County* and *in situ* soil descriptions (USDA 2010). Soil cores were excavated using a hand auger and evaluated according to procedures outlined in the USACE 1987 *Corps of Engineers Wetland Delineation Manua*l (Environmental Laboratory 1987). A description of the soil profile, including hydric indicators when present, was recorded on the Wetland Data Form for each profile (Appendix B).

2.4. Wetland Delineation

Waters of the U.S. including jurisdictional wetlands and special aquatic sites were delineated throughout the project area in accordance with criteria established in the 1987 Wetland Manual. In order to delineate a representative area as wetland, the technical criteria for hydrophytic vegetation, hydric soil, and wetland hydrology, as described in the 1987 Wetland Manual, must be satisfied. The indicator status of vegetation was derived from the National List of Plant Species that Occur in Wetlands: Northwest Region 9 (Reed 1988). A Routine Level-2 On-site Determination Method (Environmental Laboratory 1987) was used to delineate wetland areas within the project boundaries. The information was recorded electronically on the Wetland Data Form (Appendix B).

Consultation with the USACE determined that the 1987 Wetland Manual should continue to be used at MDT mitigation sites where baseline wetland conditions had been established prior to 2010. Consequently, the use of the 2010 *Regional*

Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (USACE 2010) was not required.

The wetland boundary was determined in the field based on changes in plant communities and/or hydrology, and changes in soil characteristics. Topographic relief boundaries within the project area were also examined and cross referenced with soil and vegetation communities as supportive information for this delineation. Vegetation composition, soil characteristics, and hydrology were assessed at likely wetland and adjacent upland locations. If all three parameters met the criteria, the area was designated as wetland and mapped by vegetation community type. When any one of the parameters did not exhibit positive wetland indicators, the area is determined to be upland unless the site was classified as an atypical situation, potential problem area, or special aquatic site, i.e. mud flat. The wetland boundary was identified on the aerial photograph. Wetland areas reported were estimated using geographic information system (GIS) methodology.

2.5. Wildlife

Direct observations and other positive indicators of use of mammal, reptile, amphibian, and bird species were recorded on the wetland monitoring form during the site visit. Indirect use indicators, including tracks, scat, burrow, eggshells, skins, and bones, were also recorded. These signs were recorded while traversing the site for other required activities. Direct sampling methods, such as snap traps, live traps, and pitfall traps, were not used. A comprehensive wildlife species list for the entire period of monitoring was compiled.

2.6. Functional Assessment

Functional assessments for each wetland or group of wetlands [Assessment Areas (AA)] were completed in 2001 (baseline) and from 2005 to 2007 using the 1999 MDT Montana Wetland Assessment Method (MWAM) (Berglund 1999). The 2008 MDT MWAM (Berglund and McEldowney 2008) was used in 2008 through 2010. The functional assessment provides an objective means of assigning wetlands an overall rating and of assessing mitigation success based on wetland functions. Functions are self-sustaining properties of a wetland ecosystem that exist in the absence of society and relate to ecological significance without regard to subjective human values (Berglund and McEldowney 2008). Field data for this assessment were collected during the site visit on August 11, 2010. An MDT Wetland Assessment Form was completed for each AA (Appendix B).

2.7. Photo Documentation

Monitoring at photo points provides supplemental information documenting wetland condition, trends, current land use surrounding the site, the upland buffer, the monitored area, and the vegetation transects. Photographs were taken at established photo points throughout the mitigation site during the site visit and at the end points of the transect (Appendix C). Photo point locations were recorded with a resource grade GPS unit (Figure 2, Appendix A).

2.8. GPS Data

Site features and survey points were collected with a resource grade Thales Pro Mark III GPS unit during the 2010 monitoring season. Points were collected using WAAS-enabled differential corrected satellites, typically improving resolution to sub-meter accuracy. The collected data were then transferred to a personal computer, subsequently exported into GIS, and drawn in Montana State Plane Single Zone NAD 83 meters. In addition to GPS, some site features within the site were hand-mapped onto an aerial photograph and then digitized. Site features and survey points that were mapped included fence boundaries, photograph points, transect beginnings and endings, wetland boundaries, and vegetation community boundaries.

2.9. Maintenance Needs

Outflow structures were checked for obstructions and other problems. Channels, structures, fencing, and other features were also examined during the site visit for obvious signs of breaching, damage, or other problems. This was a cursory examination and did not constitute an engineering-level structural inspection.

3. RESULTS

3.1. Hydrology

The frost-free period defined for the region characterized by the dominant soil map unit at the Wagner Marsh Site, the Larim gravelly loam, is 120 to 135 days (USDA 2010). Areas defined as wetlands would require 15 to 17 days of inundation or saturation within 12 inches of the ground surface to meet the hydrology criteria.

Groundwater was historically the primary hydrologic source at Wagner Marsh with minimal input from precipitation. The 2007 excavation of a gravel pit located west of South 56th Street diverted groundwater flows from the mitigation site causing a decrease in water levels. The MDT subsequently developed an agreement with the gravel mining company to pump water from the gravel pits to the mitigation site, resulting in an overall increase in water levels. High water levels were observed during the 2010 site visit as a result of the groundwater contributed to the site from the adjacent Knife River gravel mine. The increase of water levels led to a subsequent increase in both open water and wetland acreage.

The closest weather station to the site was Laurel, Montana, Station (244894), which closed in 1994. The mean annual precipitation rate recorded from August 1951 to February 1994 was 14.3 inches (WRCC 2010). The majority of precipitation occurred in April, May, and June (WRCC 2010). The closest active weather station is the Billings WSO, Station (240807). The average annual precipitation recorded from July 1948 through December 31, 2009, was 14.29 inches (WRCC 2010). The 2009 annual rate was 10.91, 3.38 inches below average. Total monthly precipitation through July 2009 was 6.79 inches in 2009 and 11.88 inches in 2010.

Annual evaporation pan rates were estimated to be approximately 41.27 inches at the Huntley Experiment Station 244345, located northeast of the Billings WSO station (PBS&J 2009). The evaporation rate is almost three times the annual precipitation rate.

MDT contracted with the USGS to monitor the groundwater wells at Wagner Marsh since 1998 (PBS&J 2009). Groundwater levels were highest historically in August and September and lowest during the spring months, likely the result of agricultural and irrigation influences. This hydroperiod is the opposite of a majority of wetlands in Montana potentially hindering the establishment of hydrophytic plant species that have evolved under a more typical hydrologic regime (i.e., wettest in spring, driest in late summer and early fall) (PBS&J 2009).

Groundwater levels in two monitoring wells, MW-1 and MW-3, were measured with a Solinst water level meter in 2010. The well locations are shown on Figure 2 (Appendix A). Well MW-2 was locked during the investigation and is operated by the USGS as a continually monitored well. The groundwater level measured in MW-1 located in an upland near the center of the west property boundary was 3.5 feet below the ground surface (bgs). The groundwater level in MW-3 located in the center of the north boundary near a wetland was 1.6 feet bgs.

Wetland hydrology at the mitigation site is provided by groundwater, precipitation, and overland flow. Groundwater is being pumped into the site to supplement declining groundwater elevations due to dewatering in the gravel pit to the west. The average water depth across the site was 2 feet with a range of depths in the cells estimated at 0 to 6 feet. Approximately 45 percent of the site is under inundation. Saturation was present at the three wetland data points within 1 foot of the ground surface. The water depth at the emergent vegetation-open water boundary was approximately 1 foot.

Three data points, WM-1, WM-2 and WM-3, were assessed to determine the upland and wetland boundaries (Wetland Data Forms, Appendix B). The three data points were located in areas that met the wetland criteria. Saturation at 8 and 9 inches bgs and water tables (free water in the pit) within 12 and 13 inches bgs were positive indicators of wetland hydrology at sites WM-1 and WM-2, respectively. Data point WM-3 had saturation present at 14 inches bgs and included signs of inundation (water-stained leaves, surface soil cracks) during the early growing season to provide positive evidence of seasonal inundation. A positive FAC-Neutral test provided a secondary indicator of wetland hydrology.

3.2. Vegetation

A list of 82 vegetation species identified from 2005 to 2010 is presented in Table 1 and on the Monitoring Forms (Appendix B). A total of eight community types, six wetland and two upland, were identified at the site in 2010. The community polygons are shown on Figure 3 (Appendix A) and the species composition is detailed on the Monitoring Form (Appendix B). The 2010 vegetation community

types generally corresponded to the 2009 communities except for Types 14 and 15, identified for the first time in 2010. The 2010 vegetation community types are Type 3 – *Typha latifolia*/*Eleocharis palustris* Wetland, Type 6 – Upland grasses Upland, Type 7 – *Agropyron* spp./*Festuca* spp. Upland, Type 10 – *Carex* spp./*Scirpus* spp. Wetland, Type 11 – *Phalaris arundinacea* Wetland, Type 12 - *Scirpus acutus* Wetland, Type 14 – *Elaeagnus angustifolia*/*Populus deltoides*, and Type 15 – *Hordeum jubatum*/*Typha latifolia* Wetland. Open water/Aquatic Bed is identified by the number 1 on Figure 3 (Appendix A).

Table 1. Plant species observed from 2005 to 2010 at the Wagner Marsh Mitigation Site.

Scientific Name	Common Name	Region 9 Wetland Indicator Status[1]
Agropyron cristatum	crested wheatgrass	NL
Agropyron repens	quackgrass	FACU
Agropyron smithii	wheatgrass,Western	FACU
Agrostis alba	redtop	FACW
Algae, green	**algae, green**	NL
Alopecurus arundinaceus	**foxtail,creeping**	NI
Alyssum alyssoides	**pale madwort**	NL
Asclepias speciosa	**milkweed,showy**	FAC+
Asclepias spp.		NL
Aster brachyactis	aster,rayless alkali	FACW
Aster spp. (white)	white aster spp.	NL
Beckmannia syzigachne	sloughgrass,American	OBL
Bromus inermis	smooth brome	NL
Bromus japonicus	brome,Japanese	FACU
Bromus tectorum	cheatgrass	NL
Carex lanuginosa	sedge,wooly	OBL
Carex nebrascensis	sedge,Nebraska	OBL
Carex spp.		NL
Centaurea maculosa	spotted knapweed	NL
Chenopodium album	goosefoot,white	FAC
Cirsium arvense	thistle,creeping	FACU+
Convolvulus arvensis	field bindweed	NL
Conyza canadensis	horseweed,Canada	FACU
Echinochloa muricata	grass,rough barnyard	FACW
Elaeagnus angustifolia	olive,Russian	FAC
Elaeagnus commutata	silver-berry,American	NI
Eleocharis palustris	spikerush,creeping	OBL
Elymus cinereus	**wild-rye,basin**	NI
Epilobium ciliatum	willow-herb,hairy	FACW-
Festuca idahoensis	**fescue,bluebunch**	NL
Festuca pratensis	fescue,meadow	FACU+
Glyceria striata	**grass,fowl manna**	OBL
Grindelia squarrosa	gumweed,curly-cup	FACU
Helianthus annuus	**sunflower,common**	FACU+

[1]Region 9 Great Plains (Reed 1988).
New species identified in 2010 are show in **bold** type.

Table 1. (Continued). Plant species observed from 2005 to 2010 at the Wagner Marsh Mitigation Site.

Scientific Name	Common Name	Region 9 Wetland Indicator Status[1]
Hordeum jubatum	barley,fox-tail	FAC+
Juncus balticus	**rush,Baltic**	OBL
Juncus torreyi	rush,Torrey's	FACW
Juniperus scopulorum	Rocky Mountain juniper	NL
Kochia scoparia	**summer-cypress,Mexican**	FAC
Lactuca serriola	lettuce,prickly	FAC-
Leptochloa fascicularis	sprangle-top,bearded	FACW
lotus unifoliolatus	American bird's-foot trefoil	NL
Medicago lupulina	medic,black	FAC
Medicago sativa	alfalfa	NL
Melilotus officinalis	sweetclover,yellow	FACU
Nepeta cataria	catnip	FAC
Oenothera biennis	evening-primrose,common	FACU
Panicum capillare	witchgrass	FAC
Phalaris arundinacea	**grass,reed canary**	FACW
Phleum pratense	**timothy**	FACU
Plantago major	**plantain,common**	FAC+
Poa pratensis	**bluegrass,Kentucky**	FACU+
Polygonum aviculare	knotweed,prostrate	FACW-
Polygonum lapathifolium	willow-weed	FACW+
Polygonum pensylvanicum	**smartweed,Pennsylvania**	FACW
Polygonum persicaria	thumb,lady's	FACW
Polypogon monspeliensis	grass,annual rabbit-foot	FACW+
Populus deltoides	cotton-wood,Eastern	FAC
Potamogeton filiformis	**pondweed,fine-leaf**	OBL
Potentilla anserina	silverweed	OBL
Prunus virginiana	cherry,choke	FACU
Ribes aureum	currant,golden	FAC+
Rosa woodsii	rose,Woods	FACU
Rumex crispus	dock,curly	FACW
Rumex maritimus	**dock,golden**	FACW+
Salix amygdaloides	willow,peach-leaf	FACW
Salix exigua	willow,sandbar	OBL
Salsola kali	thistle,Russian	FACU
Scirpus acutus	bulrush,hard-stem	OBL
Scirpus maritimus	bulrush,saltmarsh	OBL
Scirpus microcarpus	**bulrush,small-fruit**	OBL
Scirpus pungens	bulrush,three-square	OBL
Shepherdia argentea	silver buffaloberry	NL
Sisymbrium altissimum	mustard,tall tumble	FACU-
Solidago canadensis	golden-rod,Canada	FACU

[1]Region 9 Great Plains (Reed 1988).
New species identified in 2010 are show in **bold** type.

Table 1. (Continued). Plant species observed from 2005 to 2010 at the Wagner Marsh Mitigation Site.

Scientific Name	Common Name	Region 9 Wetland Indicator Status[1]
Sonchus arvensis	sowthistle,field	FACU+
Tamarix ramosissima	saltcedar	FACW
Taraxacum officinale	dandelion,common	FACU
Thlaspi arvense	penny-cress,field	NI
Tragopogon dubius	yellow salsify	NL
Typha angustifolia	cattail,narrow-leaf	OBL
Typha latifolia	cattail,broad-leaf	OBL
Verbena bracteata	vervain,prostrate	FACU+

[1]Region 9 Great Plains (Reed 1988).
New species identified in 2010 are show in **bold** type.

Wetland community Type 3 – *Typha latifolia*/*Eleocharis palustris* was identified in several wetland areas across the mitigation site. Dominant species were broad-leaf cattail (*Typha latifolia*), creeping spikerush (*Eleocharis palustris*), and hard-stem bulrush (*Scirpus acutus*).

Community Type 6 – Upland grasses was located along the north and west site boundaries. The community was dominated by crested wheatgrass (*Agropyron cristatum*), Japanese brome (*Bromus japonicas*), Idaho fescue (*Festuca idahoensis*), and smooth brome (*Bromus inermis*).

Upland Type 7 – *Agropyron* spp./*Festuca* spp. was identified along the east site boundary. The community was dominated by crested wheatgrass (*Agropyron cristatum*), Western wheatgrass (*Agropyron smithii*), Japanese brome (*Bromus japonicas*), Idaho fescue (*Festuca idahoensis*), and Kentucky bluegrass (*Poa pratensi*s).

Wetland community Type 10 – *Carex* spp./*Scirpus* spp. was located in a small, isolated wetland located near the center of the project site. The cover was dominated by wooly sedge (*Carex lanuginosa*), Nebraska sedge (*Carex nebrascensis*), hard-stem bulrush, small-fruited bulrush (*Scirpus microcarpus*), foxtail barley (*Hordeum jubatum*), and creeping spikerush.

Wetland community Type 11 – *Phalaris arundinacea* was found in two narrow strips of land located near the west boundary. Reed canary grass (*Phalaris arundinacea*) dominated the community. Broad-leaf cattail and willow-weed (*Polygonum lapathifolium*) were present at less than five percent cover.

Wetland community Type 12 - *Scirpus acutus* was identified in three isolated wetland areas. Hard-stem bulrush dominated the community.

Wetland community Type 14 – *Elaeagnus angustifolia*/*Populus deltoides* dominated the woody overstory in an isolated area located in the northwest portion of the project. Russian olive (*Elaeagnus angustifolia*), Eastern cottonwood (*Populus deltoides*), and sandbar willow (*Salix exigua*) dominated the cover.

Wetland community Type 15 – *Hordeum jubatum*/*Typha latifolia* located in several areas adjacent to open water was dominated by foxtail barley, broad-leaf cattail, and Pennsylvania smartweed (*Polygonum pensylvanicum*).

The Type 1 – Open water/Aquatic bed encompassed the largest area within the site. Floating aquatic organisms included green algae and floating pond weed (*Potamogeton filiformis*).

Vegetation community data were collected on a single 530-foot transect in 2010 (Monitoring Forms, Appendix B). The data is summarized in Table 2 and Charts 1 and 2. The number of communities identified on the transect remained consistent between 2009 and 2010. The extent of open water increased from 34 percent of the transect length in 2009 to 45 percent in 2010. The estimated total vegetative cover increased from 21 percent in 2009 to 56 percent in 2010. Hydrophytic species dominated approximately 53 percent of the transect intervals. Community Type 3 – *Typha latifolia*/*Eleocharis palustris* was largely replaced by Type 12 - *Scirpus acutus* in 2010.

Table 2. Data summary for Transect 1 at the Wagner Marsh Wetland Mitigation Site.

Monitoring Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
Transect Length (feet)	530	530	530	530	530	530
Vegetation Community Transitions along Transect	5	5	5	4	5	5
Vegetation Communities along Transect	4	3	3	2	2	2
Hydrophytic Vegetation Communities along Transect	2	2	1	1	2	2
Total Vegetative Species	31	31	31	19	20	17
Total Hydrophytic Species	13	15	15	16	14	15
Total Upland Species	18	16	16	3	6	2
Estimated % Total Vegetative Cover	30	45	55	30	21	56
% Transect Length Comprising Hydrophytic Vegetation Communities	67	62	65	70	66	55
% Transect Length Comprising Upland Vegetation Communities	7	6	5	0	0	0
% Transect Length Comprising Unvegetated Open Water	4	31	30	30	34	45
% Transect Length Comprising Bare Substrate	22	0	0	0	0	0

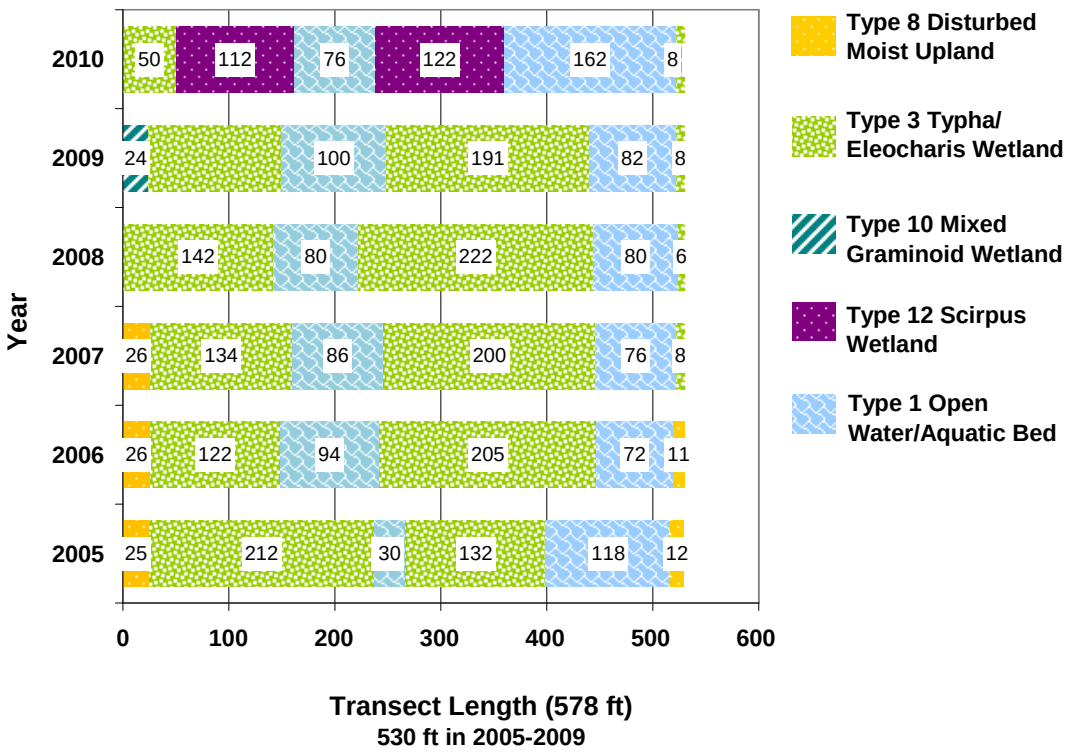

Chart 1.Transect maps showing vegetation types on Transect 1 from 2005 to 2010.

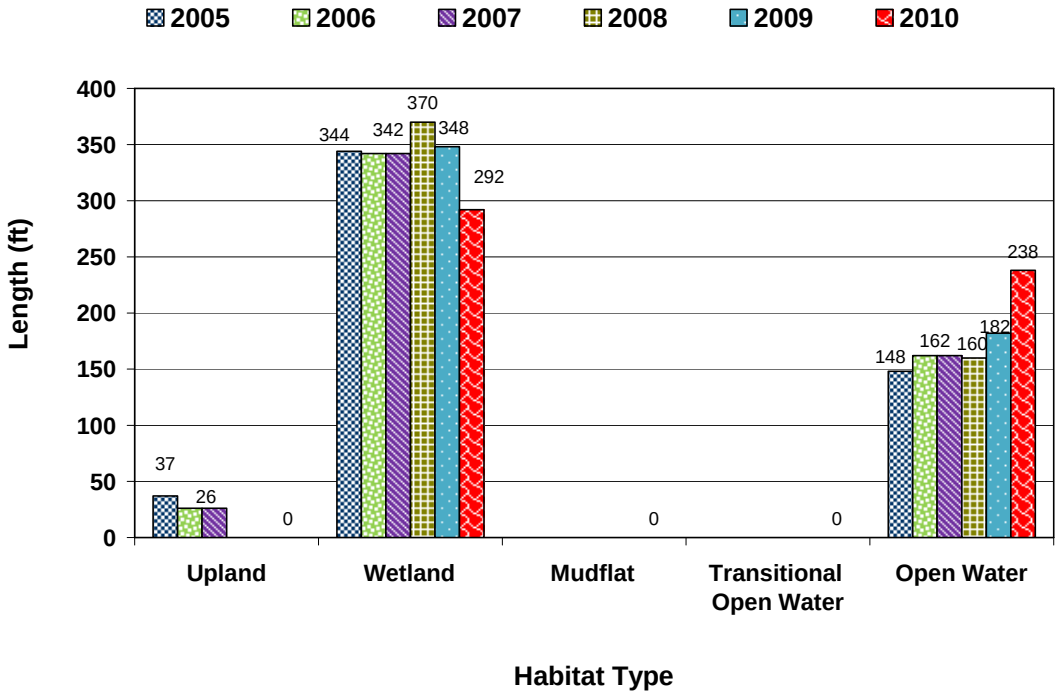

Chart 2. Length of vegetation communities within Transect 1 from 2005 to 2010.

The location of Priority 2B noxious weed infestations of spotted knapweed (*Centaurea maculosa*), Canada thistle (*Cirsium arvense*), field bindweed (*Convolvulus arvensis*), and saltcedar (*Tamarisk* spp.) were mapped on Figure 3 (Appendix A). Spotted knapweed was observed in a single area, less than 0.1 acres in size, located in the northwest portion of the site. The cover class was low. Canada thistle was prevalent throughout the site at less than 0.1 acres in size and at 1 to 5 percent cover (low cover class). Infestations of field bindweed were noted on the east edge of the site at 0.1 to 1.0 acres in size and a low cover class. Saltcedar was observed near the center of the site at less than 0.1 acres and 1 to 5 percent cover.

Approximately 550 woody plants were installed as part of the revegetation plan. The condition of 435, or 79 percent, of the plantings was monitored in 2009 (PBS&J 2009). The overall survival rate in August 2009 was estimated at 37 percent. The high mortality rate was likely the result of dessication. Approximately 150 plants, or 33 percent of the original number planted, were identified in 2010. Half of the *Juniperus scopulorum*, Eastern cottonwood, and common chokecherry (*Prunus virginiana*) were alive in 2010. Twenty percent of the golden currant (*Ribes aureum*) and Wood's rose (*Rosa woodsii*) were also alive in 2010. Ten percent of the American silverberry (*Eleagnus commutata*) and none of the silver leaf buffaloberry (*Shepherdia argentea*) survived to 2010. Willow and cottonwood recruits were noted vegetation communities 12 and 15.

3.3. Soil

The project site was mapped as urban land, Keiser silty clay loam found on 0 to 1 percent slopes, Larim loam, and Toluca clay loam found on 0 to 1 percent slopes. The Keiser series are well drained, non-hyrdic mesic Aridic Haplustalfs soils. Larim soils are well-drained, and classified as mesic Ustic Calciargids. The Toluca soils are well-drained and categorized as mesic Aridic Haplustalfs. Although the monitoring area included these NRCS map units, the site was altered by material removal while operated as a gravel mine and during construction of the mitigation complex.

Test pits at WM-1, WM-2, and W-3 were located in areas defined as wetlands. The soil profile at WM-1 revealed a silt loam (10 YR 4/2) with redoximorphic concentrations (10 YR 4/6) in the matrix. The low-chroma color and redox features provided a positive indication of hydric soil. The soil at WM-2 was a silt loam (10 YR 5/1) with redoximorphic concentrations (10 YR 4/6) in the matrix, which is evidence of a hydric soil. The soil was very gravelly and moist at 4 inches bgs. The soil profile at WM-3 revealed a clay loam (10 YR 5/1) with redox concentrations (10 YR 4/6) in the matrix. The low-chroma color and presence of redox features were positive indicators of hydric soil.

3.4. Wetland Delineation

The delineated wetland boundaries are illustrated on Figure 3 (Appendix A) and the Wetland Data Forms are included in Appendix B. Approximately 10.04 acres of wetland and 8.80 acres of open water were delineated in 2010. This

represented an increase of 1.72 acres in wetland habitat and an increase of 0.54 acres in open water habitat from 2009 to 2010. The totals include 0.18 acres of wetlands existing prior to 2001, 1.94 acres of wetlands previously created by MDT, and 1.75 acres of pre-existing open water. The total upland habitat encompassed 21.99 acres.

Table 3. Summary of aquatic habitat acreages from 2005 to 2010.

YEAR	OPEN WATER (acres)	WETLAND (acres)	TOTAL AQUATIC HABITAT (acres)
Pre-mitigation Creation:			
2001	1.75	2.12	3.87
Post-Construction:			
2005	7.88	3.96	11.84
On-going Establishment:			
2006	4.96	6.53	11.49
2007	5.80	7.50	13.30
2008	8.81	7.38	16.19
2009	8.26	8.32	16.58
2010	**8.80**	**10.04**	**18.84**

3.5. Wildlife

A list of wildlife species observed directly and indirectly from 2005 to 2010 is presented in Table 4. Fourteen bird species were identified in 2010 (Monitoring Form, Appendix B). Two unidentified turtles, white-tail deer tracks, and crayfish and muskrat burrows were observed in 2010.

Table 4. Wildlife species observed at the Wagner Marsh Wetland Mitigation Site from 2005 to 2010.

COMMON NAME	SCIENTIFIC NAME
AMPHIBIAN	
Boreal Chorus Frog	*Pseudacris maculata*
Northern Leopard Frog	*Rana pipiens*
Woodhouse's Toad	*Bufo woodhousii*
BIRD	
American Black Duck	*Anas rubripes*
American Coot	*Fulica americana*
American Crow	*Corvus brachyrhynchos*
American Goldfinch	*Spinus tristus*
American Robin	*Turdus migratorius*
American Wigeon	*Anas americana*
Barn Swallow	*Hirundo rustica*
Black-billed Magpie	*Pica hudsonia*
Blue-winged Teal	*Anas discors*

Table 4. (Continued). Wildlife species observed at the Wagner Marsh Wetland Mitigation Site from 2005 to 2010.

COMMON NAME	SCIENTIFIC NAME
BIRD	
Brewer's Blackbird	*Euphagus cyanocephalus*
California Gull	*Larus californicus*
Canada Goose	*Branta canadensis*
Cinnamon Teal	*Anas cyanoptera*
Cliff Swallow	*Petrochelidon pyrrhonota*
Gray Catbird	***Dumetella carolinensis***
Great Blue Heron	*Ardea herodias*
Greater Yellowlegs	*Tringa melanoleuca*
Green-winged Teal	*Anas crecca*
Killdeer	*Charadrius vociferus*
Lesser Scaup	*Aythya affinis*
Lesser Yellowlegs	*Tringa flavipes*
Mallard	*Anas platyrhynchos*
Mourning Dove	*Zenaida macroura*
Northern Flicker	*Colaptes auratus*
Northern Harrier	*Circus cyaneus*
Northern Pintail	*Anas acuta*
Northern Shoveler	*Anas clypeata*
Pied-billed Grebe	*Podilymbus podiceps*
Redhead	*Aythya americana*
Red-tailed Hawk	*Buteo jamaicensis*
Red-winged Blackbird	*Agelaius phoeniceus*
Ring-necked Pheasant	*Phasianus colchicus*
Rock Pigeon	*Columba livia*
RUDDY DUCK	***Oxyura jamaicensis***
Sandhill Crane	*Grus canadensis*
Song Sparrow	*Melospiza melodia*
Spotted Sandpiper	*Actitis macularius*
Tree Swallow	*Tachycineta bicolor*
Vesper Sparrow	*Pooecetes gramineus*
Western Meadowlark	*Sturnella neglecta*
Wilson's Phalarope	*Phalaropus tricolor*
Wilson's Snipe	*Gallinago delicata*
YELLOW WARBLER	***Dendroica petechia***
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*
YELLOW-RUMPED WARBLER	***Dendroica coronata***

Species first identified in 2010 are listed in **bold** type.
Species identified by MDT in 2010 are listed in **CAPS**.

Table 4 (Continued). Wildlife species observed at the Wagner Marsh Wetland Mitigation Site from 2005 to 2010.

COMMON NAME	SCIENTIFIC NAME
MAMMAL	
Black-tailed Jack Rabbit	*Lepus californicus*
Eastern Cottontail	*Sylvilagus floridanus*
Meadow Vole	*Microtus pennsylvanicus*
Mule Deer	*Odocoileus hemionus*
Muskrat	*Ondatra zibethicus*
Raccoon	*Procyon lotor*
Red Fox	*Vulpes vulpes*
White-tailed Deer	*Odocoileus virginianus*
White-tailed Jack Rabbit	*Lepus townsendii*
REPTILE	
Common Gartersnake	*Thamnophis sirtalis*
Plains Gartersnake	*Thamnophis radix*
Unidentified turtle	
INVERTEBRATE	
Crayfish	***Crayfish spp.***

Species first identified in 2010 are listed in **bold** type.
Species identified by MDT in 2010 are listed in **CAPS**.

3.6. Functional Assessment

The baseline assessment completed in 2001 and the 2006 and 2007 post-construction wetland functions and values were assessed using the 1999 MDT Montana Wetland Assessment Method (MWAM). Functional assessments from 2008 to 2010 were evaluated using the 2008 MDT MWAM. The completed 2010 Wetland Assessment Form is presented in Appendix B. The functional assessment results from 2001 to 2010 are summarized in Table 5.

The created wetlands at Wagner Marsh have been ranked as Category II wetlands since 2006, a significant improvement over the Category IV rating in 2001. The number of functional points and percentage remained the same from 2009 to 2010. The AA received 74 percent of the total possible points. Ratings were high for the functions of general wildlife habitat, short and long term surface water storage, sediment/shoreline stabilization, production export/food chain support, and groundwater discharge/recharge.

Table 5. Summary of the 2001 and 2005 through 2010 wetland function/value ratings and functional points at the Wagner Marsh Wetland Mitigation Site.

Function and Value Parameters from the MDT Montana Wetland Assessment Method	2001[1] Baseline Assessment	2005 [1]	2006 [1]	2007 [1]	2008 [2]	2009 [2]	2010 [2]
Listed/Proposed T&E Species	Low (0.5)	Low (0.5)	Low (0.5)	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)
MTNHP Species Habitat	Low (0.2)	Low (0.2)	Low (0.2)	Low (0.2)	Mod (0.6)	Mod (0.7)	High (0.9)
General Wildlife Habitat	Low (0.3)	Mod (0.7)	Mod (0.7)	Mod (0.7)	High (0.9)	High (0.9)	High (0.9)
General Fish/Aquatic Habitat	N/A	N/A	N/A	N/A	N/A	N/A	NA
Flood Attenuation	N/A	N/A	N/A	N/A	N/A	N/A	NA
Short and Long Term Surface Water Storage	Mod (0.6)	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)
Sediment/Nutrient/Toxicant	Mod (0.7)	Mod (0.7)	Mod (0.7)	Mod (0.7)	Mod (0.7)	Mod (0.7)	Mod (0.7)
Sediment/Shoreline Stabilization	N/A	Mod (0.7)	Mod (0.7)	Mod (0.7)	Mod (0.7)	Mod (1.0)	High (1.0)
Production Export/Food Chain	Mod (0.6)	High (0.8)	High (0.9)	High (0.9)	High (0.8)	High (0.8)	High (0.8)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)
Uniqueness	Low (0.2)	Mod (0.5)	Mod (0.5)	Mod (0.5)	Mod (0.5)	Mod (0.5)	Mod (0.5)
Recreation/Education Potential (bonus points*)	Low (0.2)	Low (0.1)	Mod (0.5)	High (1.0)	Mod (0.1)	Mod (0.1)	Mod (0.1)
Actual Points / Possible Points	4.3 / 9	5.8 / 10	6.7 / 10	6.7 / 10	6.3 / 9	6.7 / 9	6.9 / 9
% of Possible Score Achieved	48%	58%	67%	67%	70%	74%	77%
Overall Category	IV	III	II	II	II	II	II
Total Acreage of Assessed Aquatic Habitat within AA	**3.87**	**11.84**	**11.49**	**13.30**	**16.19**	**16.58**	**18.84**
Functional Units (acreage x actual points)	**16.64**	**68.70**	**77.00**	**89.11**	**102.00**	**111.1**	**130.0**
Net Acreage Gain	N/A	**7.84**	**7.62**	**9.43**	**12.32**	**12.71**	**14.97**
Net Functional Unit Gain	N/A	**52.1**	**60.36-2001**	**72.47-2001 12.11-2006**	**85.36-2001 12.89-2007**	**94.46-2001**	**113.36**

[1]Berglund 1999.
[2]Berglund and McEldowney 2008.
*Assessed as bonus points on 2008 form.

3.7. Photo Documentation

Representative photographs taken from photo points PP1 through PP4 in 2009 and 2010 are shown on Pages C-1 through C-6 of Appendix C. The photo point locations are shown on Figure 3 (Appendix A). Photos of the start and end of the transect are included on page C-7 of Appendix C.

3.8. Maintenance Needs

A comprehensive weed spraying program was implemented at the site in 2007 and 2008 (PBS&J 2009). The site was sprayed in 2009 and on July 20, 2010. Several infestations of spotted knapweed, Canada thistle, field bindweed, and saltcedar persisted on the site during the August 11th site visit. Saltceder was primarily confined to the central portion of the site. Field bindweed was identified in the uplands along community 7. The weed management plan should continue to be implemented to prevent the encroachment of noxious weeds into uninfested areas.

3.9. Current Credit Summary

The Wagner Marsh site will provide mitigation credits for two previously created wetland and open water areas totaling 3.87 acres and seven constructed wetland cells projected to total 17.72 acres. The pre-existing wetlands were originally created in association with the 2000 to 2001 Shiloh Road interchange project and

subsequently protected from disturbance by MDT (PBS&J 2009). An upland buffer was included in the mitigation credits for the project. A 50-foot wide buffer established around the created wetland cells was estimated at 5.19 acres in 2009 (PBS&J 2009). The credit ratios and estimated credit acreages for 2010 is presented in Table 6.

Approximately 10.04 acres of wetland and 8.80 acres of open water were delineated in 2010. This represented an increase of 1.72 acres in wetland habitat and an increase of 0.54 acres in open water habitat from 2009 to 2010. The totals included the 3.87 acres of pre-existing wetland and open water. The mitigation site encompasses 21.99 acres of upland. The credit estimate for the upland buffer presented in Table 6 was based on the 2009 estimate of 5.19 acres representing a 50-foot buffer around the wetland cells.

Table 6. Estimated credit summary for 2010.

Credit Category	2010 Aquatic Habitat Acreages	Credit Ratio	2010 Estimated Credit Acreages
Total Scrub/Shrub and Emergent Wetland	10.04	1:1	10.04
Total Open water	8.80	20% of wetland acreage**	1.76
50-foot wide upland buffer*	5.19	4:1	1.30
TOTAL	**24.03**		**13.10**

*Acreage based on 2009 estimate of a 50-foot upland buffer around wetland cells.
**Credit for open water will be limited to no more than 20 percent of the amount of actual wetland that develops at the site (PBS&J 2009).

4. REFERENCES

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Appendix A

Figures 2 and 3

MDT Wetland Mitigation Monitoring
Wagner Marsh
Yellowstone County, Montana

Figure 2: 2010 Monitoring Activity Locations

Legend

- Monitoring Limits
- Vegetation Transect
- DataPoints
- PhotoPoints
- Monitoring Wells

Base Photography Date: July 17, 2010

T-1 end
T-1 start
WM-1
WM-2
WM-3
MW1
MW2
MW3
PP1
PP2
PP3
PP4

N

0 125 250 500
Feet

GRAPHICAL REPRESENTATION MAY OR MAY NOT DEPICT THE LEGAL DESCRIPTION OF ANY PARCEL HEREIN. THIS FIGURE IS A VISUAL AID ONLY; BOUNDARY RESTORATION MUST BE MADE BY A LICENSED LAND SURVEYOR. THIS FIGURE IS INTENDED TO DISPLAY INFORMATION RELEVANT TO THE REFERENCED REPORT. CONFLUENCE MAKES NO REPRESENTATION OR WARRANTY OF ANY KIND REGARDING THIS DRAWING FOR ANY USE OTHER THAT THE ORIGINAL. ANY OTHER USE IS AT THE USER'S SOLE RISK.

LOCATION: Yellowstone Co., MT

PROJECT NO: STPX 56(50)

FILE: Wagner/Monitor2010.mxd

Project Name
MDT Wagner Marsh Mitigation Site

Drawing Title
2010 Monitoring Activity Locations

DRAWN	CHECKED	APPROVED
BCS	BV	JL

SCALE: Noted

Drawn: November 16, 2010

PROJ MGR: B Sandefur

CONFLUENCE
consulting incorporated

Figure 2

REV -

Figure 3: 2010 Mapped Site Features

Legend

- Monitoring Limits
- Wetland Limits
- Vegetation Communities
- Open Water

Base Photography Date: July 17, 2010

Noxious Weeds

- Centaurea maculosa
- Cirsium arvense
- Convolvulus arvensis
- Tamarisk

Infestation SIze

- X = <0.1 acre
- ▲ = 0.1 to 1 acre
- ■ = 1 to 5 acre

Cover Class

- T = Trace (<1% cover)
- L = Low (1-5% cover)
- M = Moderate (5-25% cover)

Vegetation Community Types

1 Open Water/Aquatic bed
3 Typha latifolia/Eleocharis palustris
6 Upland Grasses
7 Agropyron spp./Festuca spp.
10 Carex spp./Scirpus spp.
11 Phalaris arundinacea
12 Scirpus acutus
14 Elaeagnus angustifolia/Populus deltoides
15 Hordeum jubatum/Typha latifolia

Acreages

Project Area	40.83 acres
Gross Wetlands	18.84 acres
Open Water (1)	8.80 acres
Net Wetlands	10.04 acres
Uplands	21.99 acres

N

0 125 250 500

Feet

LOCATION: Yellowstone Co., MT

PROJECT NO: STPX 56(50)

FILE: Wagner/Veg2010.mxd

Project Name: MDT Wagner Marsh Mitigation Site

Drawing Title: 2010 Mapped Site Features

DRAWN	CHECKED	APPROVED
BCS	BV	JL

SCALE: Noted

Drawn: November 16, 2010

PROJ MGR: B Sandefur

CONFLUENCE consulting incorporated

Figure 3

REV -

Appendix B

2010 MDT Wetland Mitigation Site Monitoring Form
2010 USACE Wetland Determination Data Form
2010 MDT Montana Wetland Assessment Form

MDT Wetland Mitigation Monitoring
Wagner Marsh
Yellowstone County, Montana

MDT WETLAND MITIGATION SITE MONITORING FORM

Project Site: Wagner Marsh Assessment Date/Time 8/12/2010 8:01:15 AM

Person(s) conducting the assessment: B. Sandefur

Weather: Clear, warm, light breeze Location:

MDT District: Billings Milepost: NA

Legal Description: T 1S R 25E Section(s) 28

Initial Evaluation Date: 10/1/2005 Monitoring Year: 6 #Visits in Year: 1

Size of Evaluation Area: 40 (acres)

Land use surrounding wetland:

Residential and ag, active gravel pit due west, WJH Bird Resources-Waterfowl facility

HYDROLOGY

Surface Water Source: Groundwater, overland flow, evacuation of groundwater from gravel pit

Inundation: ☑ Average Depth: 2 **(ft)** Range of Depths: 0-6? **(ft)**

Percent of assessment area under inundation: 45 %

Depth at emergent vegetation-open water boundary: 1 **(ft)**

If assessment area is not inundated then are the soils saturated within 12 inches of surface: Yes

Other evidence of hydrology on the site (ex. – drift lines, erosion, stained vegetation, etc**:**

Groundwater Monitoring Wells

Record depth of water surface below ground

Well ID	Water Surface Depth
Well 3	1.6 **(ft)**
Well 1	3.5 **(ft)**

Additional Activities Checklist:

☑ Map emergent vegetation-open water boundary on aerial photograph.

☑ Observe extent of surface water during each site visit and look for evidence of past surface water elevations (drift lines, erosion, vegetation staining, etc.)

☐ Use GPS to survey groundwater monitoring well locations, if present.

Hydrology Notes:

Well 2 cap locked and is a continuous monitored well operated by USGS.

VEGETATION COMMUNITIES

Site Wagner Marsh

(Cover Class Codes **0** = < 1%, **1** = 1-5%, **2** = 6-10%, **3** = 11-20%, **4** = 21-50% , **5** = >50%)

* Indicates accepted spp name not on '88 list.

Community # 1 **Community Type:** Open Water / Aquatic bed

Species	Cover class	Species	Cover class
Algae, green	3	Open Water	5
Potamogeton filiformis	2		

Comments:

Community # 3 **Community Type:** Typha latifolia / Eleocharis palustris

Species	Cover class	Species	Cover class
Asclepias speciosa	1	Beckmannia syzigachne	1
Echinochloa muricata	1	Eleocharis palustris	3
Glyceria striata	1	Juncus torreyi	1
Nepeta cataria	1	Scirpus acutus	2
Typha latifolia	5		

Comments:

Community # 6 **Community Type:** Upland Grasses /

Species	Cover class	Species	Cover class
Agropyron cristatum	4	Alyssum alyssoides	0
Bromus inermis	2	Bromus japonicus	4
Centaurea maculosa	0	Convolvulus arvensis	1
Festuca idahoensis	4	Grindelia squarrosa	1
Hordeum jubatum	1	Kochia scoparia	1
Melilotus officinalis	1	Sisymbrium altissimum	1

Comments:

Community # 7 **Community Type:** Agropyron spp. / Festuca spp.

Species	Cover class	Species	Cover class
Agropyron cristatum	4	Agropyron smithii	4
Bromus japonicus	2	Chenopodium album	1
Convolvulus arvensis	1	Elymus cinereus	1
Festuca idahoensis	2	Hordeum jubatum	1
Kochia scoparia	1	Medicago sativa	1
Phleum pratense	1	Poa pratensis	2

Comments:

Community # 10 Community Type: Carex spp. / Scirpus spp.

Species	Cover class	Species	Cover class
Carex lanuginosa	3	Carex nebrascensis	1
Eleocharis palustris	2	Hordeum jubatum	2
Salix amygdaloides	1	Scirpus acutus	2
Scirpus microcarpus	1	Tamarix ramosissima	0
Typha latifolia	1		

Comments:

Community # 11 Community Type: Phalaris arundinacea /

Species	Cover class	Species	Cover class
Phalaris arundinacea	5	Polygonum lapathifolium	1
Typha latifolia	2		

Comments:

Community # 12 Community Type: Scirpus acutus /

Species	Cover class	Species	Cover class
Algae, green	1	Echinochloa muricata	2
Eleocharis palustris	1	Scirpus acutus	5

Comments:

Community # 14 Community Type: Elaeagnus angustifolia / Populus deltoides

Species	Cover class	Species	Cover class
Alopecurus arundinaceus	1	Asclepias speciosa	1
Elaeagnus angustifolia	3	Hordeum jubatum	1
Phalaris arundinacea	1	Polypogon monspeliensis	1
Populus deltoides	3	Salix exigua	3
Scirpus acutus	2	Tamarix ramosissima	0

Comments:

Community # 15 Community Type: Hordeum jubatum / Typha latifolia

Species	Cover class	Species	Cover class
Agropyron smithii	1	Helianthus annuus	0
Hordeum jubatum	5	Medicago lupulina	1
Panicum capillare	0	Plantago major	1
Polygonum pensylvanicum	2	Populus deltoides	0
Potentilla anserina	0	Rumex maritimus	1
Typha latifolia	3		

Comments:

VEGETATION TRANSECTS

Site: Wagner Marsh Date: 12/2010 8:01:15 AM

Transect Number: 1 **Compass Direction from Start:** 70

Interval Data:

Ending Station 50 **Community Type:** Typha latifolia / Eleocharis palustris

Species	Cover class	Species	Cover class
Asclepias speciosa	1	Carex lanuginosa	2
Carex nebrascensis	1	Cirsium arvense	0
Elaeagnus angustifolia	1	Eleocharis palustris	3
Glyceria striata	1	Juncus balticus	3
Juncus torreyi	2	Salix amygdaloides	1
Scirpus pungens	2	Typha latifolia	2

Ending Station 162 **Community Type:** Scirpus acutus /

Species	Cover class	Species	Cover class
Algae, green	2	Carex lanuginosa	3
Eleocharis palustris	2	Juncus balticus	1
Potamogeton filiformis	3	Salix amygdaloides	1
Scirpus acutus	4	Scirpus microcarpus	1
Scirpus pungens	1	Typha latifolia	3

Ending Station 238 **Community Type:** Open Water / Aquatic bed

Species	Cover class	Species	Cover class
Algae, green	3		

Ending Station 360 **Community Type:** Scirpus acutus /

Species	Cover class	Species	Cover class
Algae, green	3	Eleocharis palustris	2
Scirpus acutus	2	Typha latifolia	2

Ending Station 522 **Community Type:** Open Water / Aquatic bed

Species	Cover class	Species	Cover class
Algae, green	3	Open Water	5

Ending Station 530 **Community Type:** Typha latifolia / Eleocharis palustris

Species	Cover class	Species	Cover class
Algae, green	3	Eleocharis palustris	2
Hordeum jubatum	1	Juncus torreyi	2
Scirpus acutus	2	Scirpus pungens	1
Typha latifolia	5		

PLANTED WOODY VEGETATION SURVIVAL

Wagner Marsh

Planting Type	#Planted	#Alive	Notes
Eleagnus commutata	50	10	
Juniperus scopulorum	50	25	
Populus deltoides	50	25	
Prunus virginiana	100	50	
Ribes aureum	100	20	
Rosa woodsii	100	20	
Shepherdia argentea	100	0	

Comments

Initial mortality assumed to be primarily due to lack of water.

Wagner Marsh

WILDLIFE

Birds

Were man-made nesting structures installed? No

If yes, type of structure: _____

How many? _____

Are the nesting structures being used? No

Do the nesting structures need repairs? No

Nesting Structure Comments:

Species	#Observed	Behavior	Habitat
American Coot	2	L	MA, OW
American Goldfinch	3	FO	SS
Barn Swallow	3	FO	SS
Blue-winged Teal	5	L	OW
Canada Goose	24	L	OW
Cliff Swallow	4	FO	
Gray Catbird	1		FO, MA, SS, WM
Great Blue Heron	1	L	AB, MA, OW
Killdeer	14		AB, MF, OW, US
Mallard	6	L, N	OW
Mourning Dove	2	FO, L	UP,
Sandhill Crane	2	BP	UP, WM
Wilson's Phalarope	5		AB, MA, MF, OW
Yellow-headed Blackbird	2	L	MA

Bird Comments

BEHAVIOR CODES

BP = One of a breeding pair **BD** = Breeding display **F** = Foraging **FO** = Flyover **L** = Loafing **N** = Nesting

HABITAT CODES

AB = Aquatic bed **SS** = Scrub/Shrub **FO** = Forested **UP** = Upland buffer **I** = Island

WM = Wet meadow **MA** = Marsh **US** = Unconsolidated shore **MF** = Mud Flat **OW** = Open Water

Mammals and Herptiles

Species	# Observed	Tracks	Scat	Burrows	Comments
Crayfish		No	No	Yes	
Muskrat		No	No	Yes	
Unidentified turtle	2	No	No	No	
White-tailed Deer		Yes	No	No	

Wildlife Comments:

Wagner Marsh

PHOTOGRAPHS

Take photographs of the following permanent reference points listed in the check list below. Record the direction of the photograph using a compass. When at the site for the first time, establish a permanent reference point by setting a ½ inch rebar or fencepost extending 2-3 feet above ground. Survey the location with a resource grade GPS and mark the location on the aerial photograph.

Photograph Checklist:

☑ One photograph for each of the four cardinal directions surrounding the wetland.

☑ At least one photograph showing upland use surrounding the wetland. If more than one upland exists then take additional photographs.

☑ At least one photograph showing the buffer surrounding the wetland.

☑ One photograph from each end of the vegetation transect, showing the transect.

Photo #	Latitude	Longitude	Bearing	Description
5690			105	PP1
5916			70	Veg Tran 1 start
5918			250	Veg Tran 1, end
5919			241	PP4
5920			293	PP4
5922			324	PP4
5923			356	PP4
5933			24	PP3
5940			20	PP2
5944			343	PP3
5949			74	PP2
5952			153	PP2
5957			22	PP1
5962			162	PP1
5964			214	PP1
5966			250	PP1
5968			310	PP1
5970			335	PP1

Comments:

ADDITIONAL ITEMS CHECKLIST

Hydrology

☑ Map emergent vegetation/open water boundary on aerial photos.
☑ Observe extent of surface water. Look for evidence of past surface water elevations (e.g. drift lines, vegetation staining, erosion, etc).

Photos

☑ One photo from the wetland toward each of the four cardinal directions
☑ One photo showing upland use surrounding the wetland.
☑ One photo showing the buffer around the wetland
☑ One photo from each end of each vegetation transect, toward the transect

Vegetation

☐ Map vegetation community boundaries

☐ Complete Vegetation Transects

Soils

☐ Assess soils

Wetland Delineations

☑ Delineate wetlands according to applicable USACE protocol (1987 form or Supplement)
☑ Delineate wetland – upland boundary onto aerial photograph.

Wetland Delineation Comments

Functional Assessments

☑ Complete and attach full MDT Montana Wetland Assessment Method field forms.

Functional Assessment Comments:

Maintenance

Were man-made nesting structure installed at this site? No

If yes, do they need to be repaired? No

If yes, describe the problems below and indicate if any actions were taken to remedy the problems

Were man-made structures built or installed to impound water or control water flow into or out of the wetland? No

If yes, are the structures working properly and in good working order? No

If no, describe the problems below.

WETLAND DETERMINATION DATA FORM – Routine Weltand Delineation, 1987 COE Protocol

Project/Site: Wagner Marsh | City/County: Yellowstone | Sampling Date: 8/11/2010

Applicant/Owner: MDT | State: MT | Sampling Point: WM-1

Investigator(s): B. Sandefur | Section, Township, Range: S 28 T 1S R 25E

Landform (hillslope, terrace, etc.): Shoreline | Local relief (concave, convex, none): concave | Slope (%):

Subregion (LRR): LRR G | Lat: 45.71685 | Long: -108.65444 | Datum:

Soil Map Unit Name: Larim

Do Normal Circumstances Exist on this site? Yes ☑

Is the site significantly disturbed (Atypical Situation)? Yes ☐

Is the area a potential Problem Area? Yes ☐

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☑	No ☐	**Is the Sampled Area within a Wetland?** Yes ☑ No ☐
Hydric Soil Present?	Yes ☑	No ☐	
Wetland Hydrology Present?	Yes ☑	No ☐	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0	☐	0
2.	0	☐	0
3.	0	☐	0
4.	0	☐	0
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐	0
2.	0	☐	0
3.	0	☐	0
4.	0	☐	0
5.	0	☐	0
	0 = Total Cover		
Herb Stratum (Plot size: 5ft)			
1. Hordeum jubatum	60	☑	FACW
2. Polygonum pensylvanicum	20	☑	FACW
3. Scirpus acutus	10	☐	OBL
4. Juncus torreyi	5	☐	FACW
5. Medicago lupulina	5	☐	FACU
6.	0	☐	0
7.	0	☐	0
8.	0	☐	0
9.	0	☐	0
10.	0	☐	0
11.	0	☐	0
	100 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	0	☐	0
2.	0	☐	0
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Dominance Test is >50% ☑

Hydrophytic Vegetation Present? Yes ☑ No ☐

Remarks:

SOIL

Sampling Point: WM-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 4/3	100					Silt Loam	Very friable
3-15	10YR 4/2	95	10YR 4/6	3	C	M	Silt Loam	high amount of gravel

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☑ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Soils List
- ☐ Listed on National Soils List
- ☐ Other (explain in remarks)

Taxonomy Subgroup: Ustic Calciargids

Confirm Mapped Type?: ☐

Hydric Soil Present? Yes ☑ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators

- ☐ Innundated
- ☑ Saturated in upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage patterns in wetlands

Secondary Indicators (2 or more required)

- ☐ Oxidized Rhizospheres along Living Roots
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☑ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Field Observations:

Surface Water Present? Yes ☐ No ☑ Depth (inches): _____

Water Table Present? Yes ☑ No ☐ Depth (inches): 12

Saturation Present? (includes capillary fringe) Yes ☑ No ☐ Depth (inches): 8

Wetland Hydrology Present? Yes ☑ No ☐

Remarks:

WETLAND DETERMINATION DATA FORM – Routine Weltand Delineation, 1987 COE Protocol

Project/Site: Wagner Marsh | City/County: Yellowstone | Sampling Date: 8/11/2010

Applicant/Owner: MDT | State: MT | Sampling Point: WM-2

Investigator(s): B. Sandefur | Section, Township, Range: S 28 T 1S R 25E

Landform (hillslope, terrace, etc.): Shoreline | Local relief (concave, convex, none): undulating | Slope (%): 0

Subregion (LRR): LRR G | Lat: 45.7155933333333 | Long: -108.655505 | Datum:

Soil Map Unit Name: Larim

Do Normal Circumstances Exist on this site? Yes ☑

Is the site significantly disturbed (Atypical Situation)? Yes ☐

Is the area a potential Problem Area? Yes ☐

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☑	No ☐	**Is the Sampled Area within a Wetland?** Yes ☑ No ☐
Hydric Soil Present?	Yes ☑	No ☐	
Wetland Hydrology Present?	Yes ☑	No ☐	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0	☐	0
2.	0	☐	0
3.	0	☐	0
4.	0	☐	0
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐	0
2.	0	☐	0
3.	0	☐	0
4.	0	☐	0
5.	0	☐	0
	0 = Total Cover		
Herb Stratum (Plot size: 5ft)			
1. Hordeum jubatum	60	☑	FACW
2. Agropyron smithii	20	☐	FACU
3. Salix amygdaloides	10	☐	FACW
4. Juncus torreyi	10	☐	FACW
5. Polygonum pensylvanicum	10	☐	FACW
6.	0	☐	0
7.	0	☐	0
8.	0	☐	0
9.	0	☐	0
10.	0	☐	0
11.	0	☐	0
	110 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	0	☐	0
2.	0	☐	0
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Dominance Test is >50% ☑

Hydrophytic Vegetation Present? Yes ☑ No ☐

Remarks:

SOIL

Sampling Point: WM-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 4/2	100					Silt Loam	
3-15	10YR 5/1	95	10YR 4/6	5	C	M	Silt Loam	Very gravelly, moist @ 4in

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☑ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Soils List
- ☐ Listed on National Soils List
- ☐ Other (explain in remarks)

Taxonomy Subgroup: Ustic Calciargids

Confirm Mapped Type?: ☐

Hydric Soil Present? Yes ☑ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators

- ☐ Innundated
- ☑ Saturated in upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage patterns in wetlands

Secondary Indicators (2 or more required)

- ☐ Oxidized Rhizospheres along Living Roots
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☑ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Field Observations:

Surface Water Present?	Yes ☐	No ☑	Depth (inches):
Water Table Present?	Yes ☑	No ☐	Depth (inches): 13
Saturation Present? (includes capillary fringe)	Yes ☑	No ☐	Depth (inches): 9

Wetland Hydrology Present? Yes ☑ No ☐

Remarks:

WETLAND DETERMINATION DATA FORM – Routine Weltand Delineation, 1987 COE Protocol

Project/Site: Wagner Marsh | City/County: Yellowstone | Sampling Date: 8/11/2010

Applicant/Owner: MDT | State: MT | Sampling Point: WM-3

Investigator(s): B. Sandefur | Section, Township, Range: S 28 T 1S R 25E

Landform (hillslope, terrace, etc.): Swale | Local relief (concave, convex, none): concave | Slope (%): 0

Subregion (LRR): LRR G | Lat: 45.716405 | Long: -108.657726666667 | Datum:

Soil Map Unit Name: Keiser

Do Normal Circumstances Exist on this site? Yes ☑

Is the site significantly disturbed (Atypical Situation)? Yes ☐

Is the area a potential Problem Area? Yes ☐

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☑	No ☐	**Is the Sampled Area within a Wetland?** Yes ☑ No ☐
Hydric Soil Present?	Yes ☑	No ☐	
Wetland Hydrology Present?	Yes ☑	No ☐	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0	☐	0
2.	0	☐	0
3.	0	☐	0
4.	0	☐	0
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐	0
2.	0	☐	0
3.	0	☐	0
4.	0	☐	0
5.	0	☐	0
	0 = Total Cover		
Herb Stratum (Plot size: 5ft)			
1. Phalaris arundinacea	70	☑	FACW+
2. Hordeum jubatum	20	☑	FACW
3. Kochia scoparia	5	☐	FAC
4.	0	☐	0
5.	0	☐	0
6.	0	☐	0
7.	0	☐	0
8.	0	☐	0
9.	0	☐	0
10.	0	☐	0
11.	0	☐	0
	95 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	0	☐	0
2.	0	☐	0
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Dominance Test is >50% ☑

Hydrophytic Vegetation Present? Yes ☑ No ☐

Remarks:

SOIL

Sampling Point: WM-3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 4/2	100					Silt Loam	Gravelly
4-14	10YR 5/1	95	10YR 4/6	3	C	M	Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☑ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Soils List
- ☐ Listed on National Soils List
- ☐ Other (explain in remarks)

Taxonomy Subgroup: Aridic Haplustalfs

Confirm Mapped Type?: ☐

Hydric Soil Present? Yes ☑ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators

- ☐ Innundated
- ☐ Saturated in upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage patterns in wetlands

Secondary Indicators (2 or more required)

- ☐ Oxidized Rhizospheres along Living Roots
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☑ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Field Observations:

Surface Water Present? Yes ☐ No ☑ Depth (inches): _____

Water Table Present? Yes ☐ No ☑ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☑ Depth (inches): 14

Wetland Hydrology Present? Yes ☑ No ☐

Remarks: Surface cracks primary indicator of seasonal saturation. Area considered naturally problematic due to seasonal fluctuations and absence of wetland hydrology during site investigation.

MDT Montana Wetland Assessment Form (revised March 2008)

1. Project name Wagner Marsh **2. MDT project#** STPX 56(50) **Control#**

3. Evaluation Date 8/12/2010 **4. Evaluators** B. Sandefur **5. Wetland/Site# (s)** Wagner Marsh

6. Wetland Location(s): **T** 1S **R** 25E **Sec1** 28 **T** **R** **Sec2**

Approx Stationing or Mileposts NA

Watershed 13-Upper Yellowstone **County** Yellowstone Co., MT

7. Evaluating Agency Confluence for MDT

8. Wetland size acres 18.84

Purpose of Evaluation

How assessed: Measured e.g. by GPS

☐ **Wetlands potentially affected by MDT project**

9. Assesssment area (AA) size (acres) 18.84

☐ **Mitigation Wetlands: pre-construction**

How assessed: Measured e.g. by GPS

☑ **Mitigation Wetlands: post construction**

☐ **Other**

10. Classification of Wetland and Aquatic Habitats in AA

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% of AA
Depressional	Emergent Wetland	Excavated	Seasonal/Intermittant	35
Depressional	Aquatic Bed	Excavated	Permanent/Perennial	20
Depressional	Scrub-Shrub Wetland	Excavated	Seasonal/Intermittant	15
Depressional	Unconsolidated Bottom	Excavated	Permanent/Perennial	30

11. Estimated Relative Abundance Common

12. General Condition of AA

i. Disturbance: (use matrix below to determine [circle] appropriate response – see instructions for Montana-listed noxious weed and aquatic nuisance vegetation species (**ANVS**) lists)

Conditions within AA	*Predominant conditions adjacent to (within 500 feet of) AA*		
	Managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or buildings; and noxious weed or ANVS cover is ?15%.	Land not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to minor clearing; contains few roads or buildings; noxious weed or ANVS cover is ?30%.	Land cultivated or heavily grazed or logged; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is >30%.
AA occurs and is managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings; and noxious weed or ANVS cover is ?15%.	low disturbance	low disturbance	moderate disturbance
AA not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to relatively minor clearing, fill placement, or hydrological alteration; contains few roads or buildings; noxious weed or ANVS cover is ?30%.	moderate	moderate disturbance	high disturbance
AA cultivated or heavily grazed or logged; subject to relatively substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is >30%.	high disturbance	high disturbance	high disturbance

Comments: (types of disturbance, intensity, season, etc)

Mitigation site created in an old MDT gravel pit in 2005. Disturbance within the AA has ceased since construction was completed

ii. Prominent noxious, aquatic nuisance, other exotic species:

Centaurea maculosa, Cirsium arvense, Convolvulus arvensis, Tamarisk

iii. Provide brief descriptive summary of AA and surrounding land use/habitat

Immediately west of the site a new gravel pit has been constructed by a private company. Site adjacent to S. 56th St. W. Surrounding land has a rolling topography with agricultural and residential landuse.

13. Structural Diversity: (based on number of "Cowardin" ***vegetated*** classes present [do not include unvegetated classes], see #10 above)

Existing # of "Cowardin" Vegetated Classes in AA	Initial Rating	Is current management preventing (passive) existence of additional vegetated classes?		Modified Rating
>=3 (or 2 if 1 is forested) classes	H	NA	NA	NA
2 (or 1 if forested) classes	M	NA	NA	NA
1 class, but not a monoculture	M	<NO	YES>	L
1 class, monoculture (1 species comprises>=90% of total cover)	L	NA	NA	NA

Comments: PSS, PEM, PAB, some scattered cottonwoods.

SECTION PERTAINING to FUNCTIONS_VALUES ASSESSMENT

14A. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals:

i. AA is Documented (D) or Suspected (S) to contain (check one based on definitions contained in instructions):

Primary or critical habitat (list species) ◉ D ◉ S

Secondary habitat (list Species) ◉ D ◉ S

Incidental habitat (list species) ◉ D ◉ S

No usable habitat ☑ S

ii. Rating (use the conclusions from i above and the matrix below to arrive at [check] the functional points and rating)

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	None
Functional Points and Rating	1H	.9H	.8H	.7M	.3L	.1L	0L

Sources for documented use USFWS

14B. Habitat for plant or animals rated S1, S2, or S3 by the Montana Natural Heritage Program: (not including species listed in14A above)

i. AA is Documented (D) or Suspected (S) to contain (check one based on definitions contained in instructions):

Primary or critical habitat (list species) ◉ D ○ S Sandhill with young

Secondary habitat (list Species) ○ D ○ S

Incidental habitat (list species) ◉ D ◉ S

No usable habitat ☐ S

ii. Rating (use the conclusions from i above and the matrix below to arrive at [check] the functional points and rating)

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	None
S1 Species: *Functional Points and Rating*	1H	.8H	.7M	.6M	.2L	.1L	0L
S2 and S3 Species: *Functional Points and Rating*	.9H	.7M	.6M	.5M	.2L	.1L	0L

Sources for documented use Observed by MDT personnel in June/July.

14C. General Wildlife Habitat Rating:

i. Evidence of overall wildlife use in the AA (check substantial, moderate, or low based on supporting evidence):

Substantial (based on any of the following [check]):

- [x] observations of abundant wildlife #s or high species diversity (during any period)
- [x] abundant wildlife sign such as scat, tracks, nest structures, game trails, etc.
- [ ] presence of extremely limiting habitat features not available in the surrounding area
- [ ] interviews with local biologists with knowledge of the AA

Minimal (based on any of the following [check]):

- [ ] few or no wildlife observations during peak use periods
- [ ] little to no wildlife sign
- [ ] sparse adjacent upland food sources
- [ ] interviews with local biologists with knowledge of the AA

Moderate (based on any of the following [check]):

- [ ] observations of scattered wildlife groups or individuals or relatively few species during peak periods
- [ ] common occurrence of wildlife sign such as scat, tracks, nest structures, game trails, etc.
- [ ] adequate adjacent upland food sources
- [ ] interviews with local biologists with knowledge of the AA

ii. Wildlife habitat features (Working from top to bottom, check appropriate AA attributes in matrix to arrive at rating. Structural diversity is from #13. For class cover to be considered evenly distributed, the most and least prevalent **vegetated** classes must be within 20% of each other in terms of their percent composition of the AA (see #10). Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; and A = absent [see instructions for further definitions of these terms])

Structural diversity (see #13)	High								Moderate								Low			
Class cover distribution (all vegetated classes)	Even				Uneven				Even				Uneven				Even			
Duration of surface water in ≥ 10% of AA	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A
Low disturbance at AA (see #12i)	E	E	E	H	E	E	H	H	E	H	H	M	E	H	M	M	E	H	M	M
Moderate disturbance at AA (see #12i)	H	H	H	H	H	H	H	M	H	H	M	M	H	M	M	L	H	M	L	L
High disturbance at AA (see #12i)	M	M	M	L	M	M	L	L	M	M	L	L	M	L	L	L	L	L	L	L

iii. Rating (use the conclusions from i and ii above and the matrix below to arrive at [check] the functional points and rating)

Evidence of wildlife use (i)	*Wildlife habitat features rating (ii)*			
	Exceptional	High	Moderate	Low
Substantial	1E	.9H	.8H	.7M
Moderate	.9H	.7M	.5M	.3L
Minimal	.6M	.4M	.2L	.1L

Comments Site is well used by migrating waterfowl, upland game birds, deer, and moderate to small-sized mammals.

14D. General Fish Habitat Rating: (Assess this function if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [i.e., fish use is precluded by perched culvert or other barrier, etc.]. If the AA is not used by fish, fish use is not restorable due to habitat constraints, or is not desired from a management perspective [such as fish entrapped in a canal], then check [x] **NA** here and proceed to 14E.)

i. Habitat Quality and Known / Suspected Fish Species in AA (use matrix to arrive at [check the functional points and rating)

Duration of surface water in AA	Permanent / Perennial						Seasonal / Intermittent						Temporary / Ephemeral					
Aquatic hiding / resting / escape cover	Optimal		Adequate		Poor		Optimal		Adequate		Poor		Optimal		Adequate		Poor	
Thermal cover optimal / suboptimal	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S
FWP Tier I fish species	1E	.9H	.8H	.7M	.6M	.5M	.9H	.8H	.7M	.6M	.5M	.4M	.7M	.6M	.5M	.4M	.3L	.3L
FWP Tier II or Native Game fish species	.9H	.8H	.7M	.6M	.5M	.5M	.8H	.7M	.6M	.5M	.4M	.4M	.6M	.5M	.4M	.3L	.2L	.2L
FWP Tier III or Introduced Game fish	.8H	.7M	.6M	.5M	.5M	.4M	.7M	.6M	.5M	.4M	.4M	.3L	.5M	.4M	.3L	.2L	.2L	.1L
FWP Non-Game Tier IV or No fish species	.5M	.5M	.5M	.4M	.4M	.3L	.4M	.4M	.4M	.3L	.3L	.2L	.2L	.2L	.2L	.1L	.1L	.1L

Sources used for identifying fish sp. potentially found in AA:

ii. Modified Rating (**NOTE:** Modified score cannot exceed 1 or be less than 0.1)
a) Is fish use of the AA significantly reduced by a culvert, dike, or other man-made structure or activity ***or*** *is the waterbody included on the current final MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support,* ***or*** *do aquatic nuisance plant or animal species (see* ***Appendix E****) occur in fish habitat?* **Y** ◯ **N** ◉ *If yes, reduce score in* ***i*** *above by 0.1:* **Modified Rating**

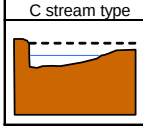
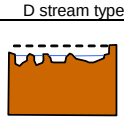
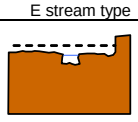
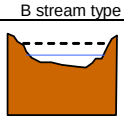
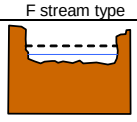
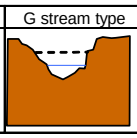
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ◯ **Y** ◉ **N** *If yes, add 0.1 to the adjusted score in* ***i*** *or* ***iia*** *above:*
Modifed Rating

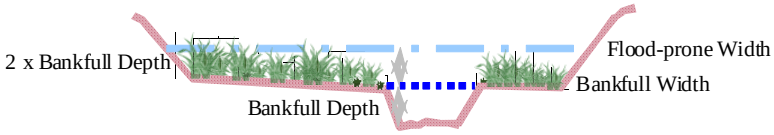
iii. Final Score and Rating: _____ **Comments:**

14E. Flood Attenuation: (Applies only to wetlands subject to flooding via in-channel or overbank flow. If wetlands in AA are not flooded from in-channel or overbank flow, click ☑ **NA** here and proceed to 14F.)

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating)

Estimated or Calculated Entrenchment (Rosgen 1994, 1996)	Slightly entrenched - C, D, E stream types			Moderately entrenched – B stream type			Entrenched-A, F, G stream types		
% of flooded wetland classified as forested and/or scrub/shrub	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
AA contains **no outlet or restricted outlet**	1H	.9H	.6M	.8H	.7M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.8H	.5M	.7M	.6M	.4M	.3L	.2L	.1L

Slightly Entrenched ER = >2.2			**Moderately Entrenched ER = 1.41 – 2.2**	**Entrenched ER = 1.0 – 1.4**		
C stream type	D stream type	E stream type	B stream type	A stream type	F stream type	G stream type
						



Floodrpone width _____ **/** **Bankfull width** _____ **=** **Entrenchment ratio** _____

ii. Are ≥10 acres of wetland in the AA subject to flooding **AND** are man-made features which may be significantly damaged by floods located within 0.5 mile downstream of the AA (check)? **Y** ◯ **N** ◉

Comments:

14F. Short and Long Term Surface Water Storage: (Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow. If no wetlands in the AA are subject to flooding or ponding, click ☐ **NA** here and proceed to 14G.)

i. Rating (Working from top to bottom, use the matrix below to arrive at [check] the functional points and rating. Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; and T/E = temporary/ephemeral [see instructions for further definitions of these terms].)

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding	>5 acre feet			1.1 to 5 acre feet			≤1 acre foot		
Duration of surface water at wetlands within the AA	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Wetlands in AA flood or pond **≥ 5 out of 10 years**	1H	.9H	.8H	.8H	.6M	.5M	.4M	.3L	.2L
Wetlands in AA flood or pond **< 5 out of 10 years**	.9H	.8H	.7M	.7M	.5M	.4M	.3L	.2L	.1L

Comments:

14G. Sediment/Nutrient/Toxicant Retention and Removal: (Applies to wetlands with potential to receive sediments, nutrients, or toxicants through influx of surface or ground water or direct input. If no wetlands in the AA are subject to such input, click ☐ **NA** here and proceed to 14H.)

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating [H = high, M = moderate, or L = low])

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with potential to deliver levels of sediments, nutrients, or compounds at levels such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants **or** AA receives or surrounding land use with potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
% cover of wetland vegetation in AA	≥ 70%		< 70%		≥ 70%		< 70%	
Evidence of flooding / ponding in AA	Yes	No	Yes	No	Yes	No	Yes	No
AA contains **no or restricted outlet**	1H	.8H	.7M	.5M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.7M	.6M	.4M	.4M	.3L	.2L	.1L

Comments:

14H Sediment/Shoreline Stabilization: (Applies only if AA occurs on or within the banks or a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body which is subject to wave action. If 14H does not apply, click ☐ **NA** here and proceed to 14I.)

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating)

*% Cover of **wetland** streambank or shoreline by species with stability ratings of ≥6 (see **Appendix F**).*	*Duration of surface water adjacent to rooted vegetation*		
	Permanent / Perennial	Seasonal / Intermittent	Temporary / Ephemeral
≥ 65%	1H	.9H	.7M
35-64%	.7M	.6M	.5M
< 35%	.3L	.2L	.1L

Comments: Shoreline vegetation is generally well established and provides adequate bank protection.

14I. Production Export/Food Chain Support:

i. Level of Biological Activity (synthesis of wildlife and fish habitat ratings [check])

General Fish Habitat Rating (14D.iii.)	**General Wildlife Habitat Rating (14C.iii.)**		
	E/H	M	L
E/H	H	H	M
M	H	M	M
L	M	M	L
N/A	H	M	L

ii. Rating (Working from top to bottom, use the matrix below to arrive at [check] the functional points and rating. Factor A = acreage of vegetated wetland component in the AA; Factor B = level of biological activity rating from above (14I.i.); Factor C = whether or not the AA contains a surface or subsurface outlet; the final three rows pertain to duration of surface water in the AA, where P/P, S/I, and T/E are as previously defined, and A = "absent" [see instructions for further definitions of these terms].)

A	Vegetated component >5 acres						Vegetated component 1-5 acres						Vegetated component <1 acre					
B	High		Moderate		Low		High		Moderate		Low		High		Moderate		Low	
C	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
P/P	1E	.7H	.8H	.5M	.6M	.4M	.9H	.6M	.7H	.4M	.5M	.3L	.8H	.6M	.6M	.4M	.3L	.2L
S/I	.9H	.6M	.7H	.4	.5M	.3L	.8H	.5M	.6M	.3L	.4M	.2L	.7H	.5M	.5M	.3L	.3L	.2L
T/E/A	.8H	.5M	.6M	.3L	.4M	.2L	.7H	.4M	.5M	.2L	.3L	.1L	.6M	.4M	.4M	.2L	.2L	.1L

iii. Modified Rating (**NOTE:** Modified score cannot exceed 1 or be less than 0.1.) **Vegetated Upland Buffer (VUB)**: Area with ≥ 30% plant cover, ≤ 15% noxious weed or ANVS cover, and that is not subjected to periodic mechanical mowing or clearing (unless for weed control).

a) Is there an average ≥ 50 foot-wide vegetated upland buffer around ≥ 75% of the AA circumference? **Y** ◉ **N** ○ *If yes, add 0.1 to the score in **ii** above and adjust rating accordingly:* **Modified Rating** .8H

Comments:

14J. Groundwater Discharge/Recharge: (check the appropriate indicators in i & ii below)

i. Discharge Indicators

- ☐ The AA is a slope wetland
- ☐ Springs or seeps are known or observed
- ☑ Vegetation growing during dormant season/drought
- ☐ Wetland occurs at the toe of a natural slope
- ☐ Seeps are present at the wetland edge
- ☑ AA permanently flooded during drought periods
- ☐ Wetland contains an outlet, but no inlet
- ☐ Shallow water table and the site is saturated to the surface
- ☐ Other:

ii. Recharge Indicators

- ☐ Permeable substrate present without underlying impeding layer
- ☐ Wetland contains inlet but no outlet
- ☐ Stream is a known 'losing' stream; discharge volume decreases
- ☐ Other:

iii. Rating (use the information from i and ii above and the table below to arrive at [check] the functional points and rating)

	Duration of saturation at AA Wetlands *FROM GROUNDWATER DISCHARGE OR WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM*			
Criteria	P/P	S/I	T	None
Groundwater Discharge or Recharge	1H	.7M	.4M	.1L
Insufficient Data/Information	NA			

Comments:

14K. Uniqueness:

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating)

Replacement potential	AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland **or** plant association listed as "S1" by the MTNHP			AA does not contain previously cited rare types **and** structural diversity (#13) is high **or** contains plant association listed as "S2" by the MTNHP			AA does not contain previously cited rare types or associations **and** structural diversity (#13) is low-moderate		
Estimated relative abundance (#11)	rare	common	abundant	rare	common	abundant	rare	common	abundant
Low disturbance at AA (#12i)	1H	.9H	.8H	.8H	.6M	.5M	.5M	.4M	.3L
Moderate disturbance at AA (#12i)	.9H	.8H	.7M	.7M	.5M	.4M	.4M	.3L	.2L
High disturbance at AA (#12i)	.8H	.7H	.6M	.6M	.4M	.3L	.3L	.2L	.1L

Comments:

14L. Recreation/Education Potential: (affords "bonus" points if AA provides recreation or education opportunity)

i. Is the AA a known or potential rec./ed. site: (check) **Y** ◉ **N** ○ (if 'Yes' continue with the evaluation; if 'No' then click ☐ **NA** here and proceed to the overall summary and rating page)

ii. Check categories that apply to the AA: ☑ Educational/scientific study; ☐ Consumptive rec.; ☐ Non-consumptive rec.; ☐ Other

iii. Rating (use the matrix below to arrive at [check] the functional points and rating)

Known or Potential Recreation or Education Area	Known	Potential
Public ownership or public easement with general public access (no permission required)	.2H	.15H
Private ownership with general public access (no permission required)	.15H	.1M
Private or public ownership without general public access, or requiring permission for public access	.1M	.05L

Comments:

The site receives educational use through the WJH Bird Facility that is north-adjacent to the mitigation area. Site is also used by Audubon Society for bird counts.

General Site Notes

FUNCTION & VALUE SUMMARY & OVERALL RATING FOR WETLAND/SITE #(S): Wagner Marsh

Function & Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)	Indicate the four most prominent functions with an asterisk (*)
A. Listed/Proposed T&E Species Habitat	L	0	1	0	☐
B. MT Natural Heritage Program Species Habitat	H	.9	1	16.956	☐
C. General Wildlife Habitat	H	.9	1	16.956	☑
D. General Fish Habitat	NA	0	0	0	☐
E. Flood Attenuation	NA	0	0	0	☐
F. Short and Long Term Surface Water Storage	H	1	1	18.84	☑
G. Sediment/Nutrient/Toxicant Removal	M	.7	1	13.188	☐
H. Sediment/Shoreline Stabilization	H	1	1	18.84	☑
I. Production Export/Food Chain Support	H	.8	1	15.072	☐
J. Groundwater Discharge/Recharge	H	1	1	18.84	☑
K. Uniqueness	M	.5	1	9.42	☐
L. Recreation/Education Potential (bonus points)	M	.1	NA	1.884	☐
Totals:		6.9	9	129.996	
Percent of Possible Score			**76.67** %		

Category I Wetland: (must satisfy **one** of the following criteria; otherwise go to Category II)
- ☐ Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; **or**
- ☐ Score of 1 functional point for Uniqueness; **or**
- ☐ Score of 1 functional point for Flood Attenuation **and** answer to Question 14E.ii is "yes"; **or**
- ☐ Percent of possible score > 80% (round to nearest whole #).

Category II Wetland: (Criteria for Category I not satisfied **and** meets any **one** of the following criteria; otherwise go to Category IV)
- ☐ Score of 1 functional point for MT Natural Heritage Program Species Habitat; **or**
- ☑ Score of .9 or 1 functional point for General Wildlife Habitat; **or**
- ☐ Score of .9 or 1 functional point for General Fish Habitat; **or**
- ☐ "High" to "Exceptional" ratings for **both** General Wildlife Habitat **and** General Fish/Aquatic Habitat; **or**
- ☐ Score of .9 functional point for Uniqueness; **or**
- ☑ Percent of possible score > 65% (round to nearest whole #).

Category III Wetland: (Criteria for Categories I, II, or IV not satisfied)

☐

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; otherwise go to Category III)
- ☐ "Low" rating for Uniqueness; **and**
- ☐ Vegetated wetland component < 1 acre (do not include upland vegetated buffer); **and**
- ☐ Percent of possible score < 35% (round to nearest whole #).

OVERALL ANALYSIS AREA RATING:
(check appropriate category based on the criteria outlined above)

I	II	III	IV

Appendix C

Project Area Photographs

MDT Wetland Mitigation Monitoring
Wagner Marsh
Yellowstone County, Montana

Photo Point 1 – *Photo 1* **Location:** North Side
Bearing: 22 Degrees **Taken in 2009**

Photo Point 1 – *Photo 1* **Location:** North Side
Bearing: 22 Degrees **Taken in 2010**

Photo Point 1 – *Photo 2* **Location:** North Side
Bearing: 105 Degrees **Taken in 2009**

Photo Point 1 – *Photo 2* **Location:** North Side
Bearing: 105 Degrees **Taken in 2010**

Photo Point 1 – *Photo 3* **Location:** North Side
Bearing: 162 Degrees **Taken in 2009**

Photo Point 1 – *Photo 3* **Location:** North Side
Bearing: 162 Degrees **Taken in 2010**

Photo Point 1 – *Photo 4*
Bearing: 214 Degrees
Location: North Side
Taken in 2009

Photo Point 1 – *Photo 4*
Bearing: 214 Degrees
Location: North Side
Taken in 2010

Photo Point 1 – *Photo 5*
Bearing: 250 Degrees
Location: North Side
Taken in 2009

Photo Point 1 – *Photo 5*
Bearing: 205 Degrees
Location: North Side
Taken in 2010

Photo Point 1 – *Photo 6*
Bearing: 310 Degrees
Location: North Side
Taken in 2009

Photo Point 1 – *Photo 6*
Bearing: 310 Degrees
Location: North Side
Taken in 2010

Photo Point 1 – *Photo 7*
Bearing: 335 Degrees
Location: North Side
Taken in 2009

Photo Point 1 – *Photo 7*
Bearing: 335 Degrees
Location: North Side
Taken in 2010

Photo Point 2 – *Photo 1*
Bearing: 1 Degrees
Location: West Side
Taken in 2009

Photo Point 2 – *Photo 1*
Bearing: 1 Degrees
Location: West Side
Taken in 2010

Photo Point 2 – *Photo 2*
Bearing: 74 Degrees
Location: West Side
Taken in 2009

Photo Point 2 – *Photo 2*
Bearing: 74 Degrees
Location: West Side
Taken in 2010

Photo Point 2 – *Photo 3*
Bearing: 153 Degrees
Location: West Side
Taken in 2009

Photo Point 2 – *Photo 3*
Bearing: 153 Degrees
Location: West Side
Taken in 2010

Photo Point 3 – *Photo 1*
Bearing: 24 Degrees
Location: South Side
Taken in 2009

Photo Point 3 – *Photo 1*
Bearing: 24 Degrees
Location: South Side
Taken in 2010

Photo Point 3 – *Photo 2*
Bearing: 243 Degrees
Location: South Side
Taken in 2009

Photo Point 3 – *Photo 2*
Bearing: 243 Degrees
Location: South Side
Taken in 2010

Photo Point 3 – *Photo 3*
Bearing: 294 Degrees
Location: South Side
Taken in 2009

Photo Point 3 – *Photo 3*
Bearing: 294 Degrees
Location: South Side
Taken in 2010

Photo Point 3 – *Photo 4*
Bearing: 343 Degrees
Location: South Side
Taken in 2009

Photo Point 3 – *Photo 4*
Bearing: 343 Degrees
Location: South Side
Taken in 2010

Photo Point 4 – *Photo 1*
Bearing: 241 Degrees
Location: East Side
Taken in 2009

Photo Point 4 – *Photo 1*
Bearing: 241 Degrees
Location: East Side
Taken in 2010

Photo Point 4 – *Photo 2* **Location:** East Side
Bearing: 293 Degrees **Taken in 2009**

Photo Point 4 – *Photo 2* **Location:** East Side
Bearing: 293 Degrees **Taken in 2010**

Photo Point 4 – *Photo 3* **Location:** East Side
Bearing: 324 Degrees **Taken in 2009**

Photo Point 4 – *Photo 3* **Location:** East Side
Bearing: 324 Degrees **Taken in 2010**

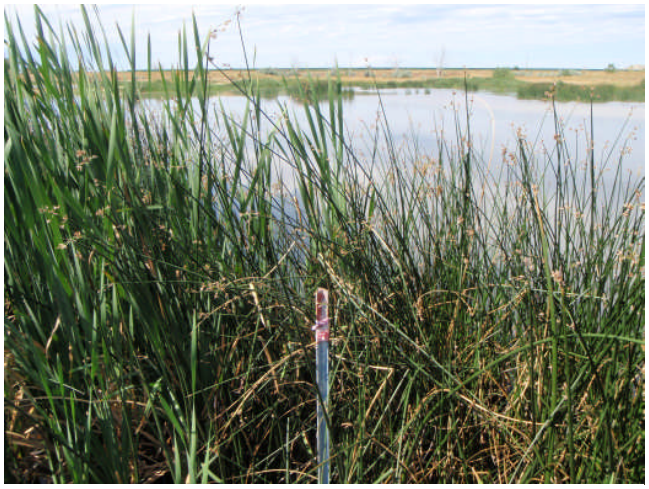
Photo Point 4 – *Photo 4* **Location:** East Side
Bearing: 356 Degrees **Taken in 2009**

Photo Point 4 – *Photo 4* **Location:** East Side
Bearing: 356 Degrees **Taken in 2010**

Transect 1 – *West End*
Bearing: 70 Degrees
Location: T-1 start
Taken in 2009

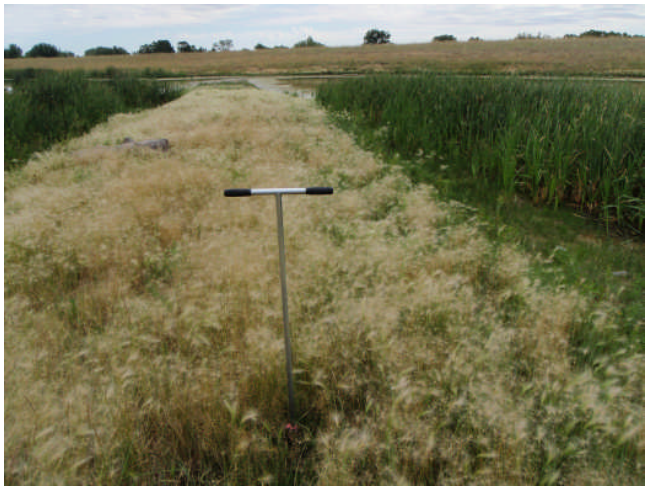
Transect 1 – *East End*
Bearing: 70 Degrees
Location: T-1 start
Taken in 2010

Transect 1 – *East End*
Bearing: 250 Degrees
Location: T-1 end
Taken in 2009



Transect 1 – *East End*
Bearing: 250 Degrees
Location: T-1 end
Taken in 2010

Data Point 1
Bearing: 110 Degrees
Location: WM-1
Taken in 2010



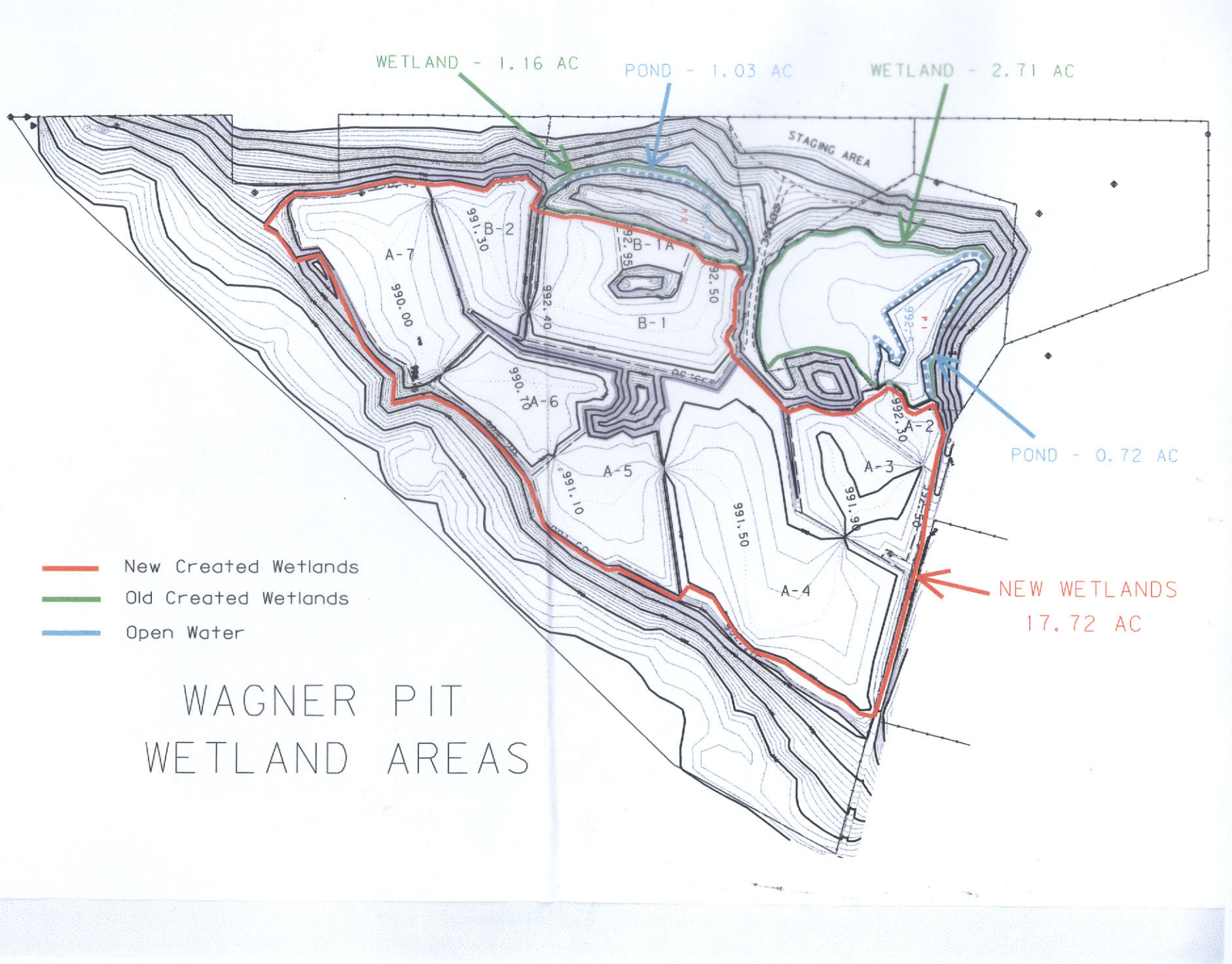
Data Point 2
Bearing: 90 Degrees
Location: WM-2
Taken in 2010

Data Point 3 **Location:** WM-3
Bearing: 270 Degrees **Taken in 2010**

Appendix D

Project Plan Sheet

MDT Wetland Mitigation Monitoring
Wagner Marsh
Yellowstone County, Montana


WETLAND - 1.16 AC
POND - 1.03 AC
WETLAND - 2.71 AC
STAGING AREA
A-7
B-2
B-1A
B-1
A-6
A-5
A-4
A-3
A-2
POND - 0.72 AC
NEW WETLANDS
17.72 AC
New Created Wetlands
Old Created Wetlands
Open Water
WAGNER PIT
WETLAND AREAS